

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-072536  
(43)Date of publication of application : 17.03.1995

(51)Int.Cl. G03B 15/05  
G03B 15/03

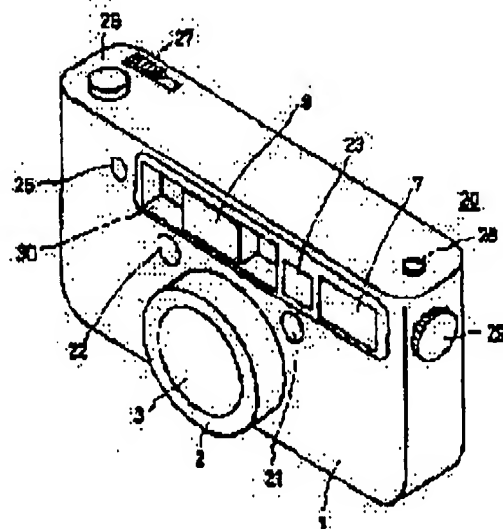
(21)Application number : 05-243586 (71)Applicant : NIKON CORP  
(22)Date of filing : 06.09.1993 (72)Inventor : TERUNUMA HIROSHI  
IJIMA SHUJI

## (54) CAMERA WITH BUILT-IN FLASH LIGHT EMITTING DEVICE

### (57)Abstract:

**PURPOSE:** To execute excellent flash photographing where a shadow is hardly formed.

**CONSTITUTION:** 1st and 2nd flash light emitting devices 7 and 9 are arranged in a camera main body 1. In the case of flash photographing, the device 7 emits light when a subject is at a farther position than a specified distance. The device 9 emits the light together with the device 7 in the case of close-up photographing where the subject is closer than the specified distance. The device 9 is allowed to slide in a right-and-left direction according to the condition of the subject so as to change an irradiation area and soften the shadow of the subject. When a preliminary light emission button 28 is operated, the devices 7 and 9 are allowed to simultaneously emit light regardless of a shutter.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

## [Title of the Invention]

## Camera With Built-in Flash Light Emitting Devices

## [Scope of Claims for Patent]

1. A camera with built-in flash light emitting devices comprising a plurality of flash light emitting devices, characterized in that at least one of the light emitting devices is arranged slidable in left/right directions.

2. The camera with built-in flash light emitting devices according to claim 1, characterized in that the slidable flash light emitting device emits light together with another light emitting device only when a subject is closer than a prescribed distance.

3. The camera with built-in flash light emitting devices according to claim 1 or 2, further comprising means for causing the flash light emitting devices to emit light independent of a shutter mechanism.

## [Detailed Description of the Invention]

[0001]

The present invention relates to a camera with a built-in flash light emitting device and, more specifically, to a camera with a plurality of flash light emitting devices.

[0002]

## [Prior Art]

Conventionally, in a camera with flash light emitting device, one very small light emitting device has been provided inside.

[0003]

In the conventional camera with flash light emitting device mentioned above, in order to reduce the camera size, a flash light emitting device of a very small size has been used and, as a result, a photograph taken by such a camera had an undesirable dark shadow. Specifically, though there is not any problem in taking a normal photograph, the subject is irradiated directly with light of high intensity at the time of taking a close-up photograph (photograph taken at a close range). Therefore, a very dark shadow surrounds the subject and the photograph is quite unnatural.

[0004]

Figs. 3 and 4 show how shadows are generated in the vertical and horizontal directions when a close-up photograph is taken by the conventional camera with flash light emitting device having one flash light emitting device contained therein. In these figures, reference numeral 1 denotes a camera body, 2 denotes a lens barrel, 3 denotes an image pick-up lens, 4 denotes an image forming film, 5 denotes a subject, 6 denotes an optical axis, and 7 denotes a flash light emitting device. Flash light emitting device 7 is generally arranged at an upper right portion on a front surface of camera body 1

when camera body 1 is view frontally. When light is emitted from flash light emitting device 7, shadows 8 (8a to 8d) generate on the rear side and lower side of subject 5. Here, shadows 8a and 8c do not appear on the photograph as they are behind the subject 5. Shadows 8b and 8d, however, generate at the lower side and right side of subject 5, respectively, and hence, these appear on the photograph as shadows surrounding the lower side and right side of subject 5, resulting in a close-up photograph of unsatisfactory quality.

[0005]

In view of the foregoing, recently, a camera has been proposed that contains two flash light emitting devices 7 and 9 as shown in Fig. 5, and these devices are controlled independently or selectively in accordance with photographing conditions, to prevent or lessen generation of shadows. In such a camera, the shadow 8d that could not be removed by one flash light emitting device 7 described above is advantageously made less sharp by another flash light emitting device 9.

[0006]

#### [Problems to be Solved by the Invention]

In the conventional camera with two flash light emitting devices 7 and 9, however, these flash light emitting devices 7 and 9 are arranged fixed on camera body 1, and it is impossible to change the area to be irradiated in accordance with the photographing conditions. Therefore, dependent on the position of arrangement, if the shadow 8d has wide area, it is impossible to irradiate the entire area as shown in Fig. 5. Further, if a light source 10 is positioned on the right of the camera as one faces, a shadow 11 derived from light source 10 appears on the outside of shadow 8d. There is no counter-measure to the shadow 11. Thus, a good close-up photograph could not be obtained.

[0007]

The present invention was made in view of the problems of the conventional art as described above, and its object is to provide a camera with built-in flash light emitting devices allowing change in irradiation area in accordance with subject conditions and allowing photographing with flash light to provide natural shadows.

[0008]

#### [Means for Solving the Problems]

In order to attain the above-described object, a camera with built-in flash light emitting devices in accordance with a first invention includes a plurality of flash light emitting devices, characterized in that at least one of the light emitting devices is arranged slidable in left/right directions. The second invention is based on the first

invention, wherein the slidable flash light emitting device emits light together with another light emitting device only when a subject is closer than a prescribed distance. The third invention is based on the first or second invention, and further includes means for causing the flash light emitting devices to emit light independent of a shutter mechanism.

[0009]

[Function]

In the present invention, the slidable flash light emitting device is slid in accordance with subject conditions, so that the area of irradiation changes, and it is caused to emit light simultaneously with another flash light emitting device for taking a photograph at a close range (close-up photograph) with the subject being at a position closer than a prescribed distance. Thus, a shadow caused by said another flash light emitting device can be cancelled effectively. The means for causing the flash light emitting devices to emit light allows emission of light by the flash light emitting devices by themselves, independent of the shutter mechanism. Therefore, it is possible to confirm how the shadow of the subject appears before actually taking the photograph.

[0010]

[Embodiment]

In the following, an embodiment of the present invention will be described in detail with reference to the figures. Fig. 1 is a perspective view of an appearance showing an embodiment of the camera with built-in flash light emitting devices in accordance with the present invention. Fig. 2 shows a shadow in the horizontal direction and the range of photographing when the flash light emitting devices are used. The same components as those of Figs. 3 to 5 are denoted by the same reference characters. In these figures, a compact camera having lens barrel 2 arranged approximately at the center of the front surface of camera body 1 is shown as an example of the camera generally represented by reference character 20.

[0011]

Image pick-up lens 3 incorporated in lens barrel 2 is implemented, for example, by a zoom lens or a fixed focal-length lens. As to the photographable distance, 50 cm or shorter would be effective for a close-up photograph, and the arrangement allows setting of photographing distance in the range of about 1 to about 1.5 m for a portrait photograph, that is, a normal photograph.

[0012]

Further, on an upper portion on the front surface of camera body 1 described above, a light projecting window 21 for AF (Auto Focusing) and a light receiving window

22 for AF are provided on opposite sides of lens barrel 2. Further, above light projecting and light receiving windows 21 and 22, the first flash light emitting device 7, a finder window 23, the second flash light emitting device 9 and an exposure window 25 are arranged aligned in lateral direction in this order from the right side when camera 20 is viewed frontally. On one side of an upper surface of camera body 1, a release button 26 and a shutter button 27 are arranged. On the side opposite to release button 26 and shutter button 27 of the upper surface, a preliminary light emission button (means) 28 is provided for causing two flash light emitting devices 7 and 9 to emit light simultaneously independent of the shutter mechanism. Further, on an upper portion of a side surface opposite to release button 26 of camera body 1, a knob 29 forming a slide mechanism of said second flash light emitting device 9 is provided. AF light projecting window 21 and light receiving portion 22 allow measurement of distance to subject 5, and by driving control from a control portion, not shown, auto-focusing operation of image pick-up lens 3 is realized.

[0013]

The first flash light emitting device 7 is arranged horizontally in an immobile manner, at a position similar to that of the conventional example, that is, on one side (on the right side of Fig. 1) at an upper portion of the front surface of camera body 1. The first flash light emitting device 7 is adopted such that at the time of taking a photograph at a long range, that is, when subject 5 is at a position further than a prescribed distance, the first flash light emitting device 7 emits light by itself, and at the time of taking a photograph at a close range, that is, when subject 5 is at a position closer than a prescribed distance and at the time of confirming how the shadow of subject 5 appears, the first flash light emitting device 7 emits light simultaneously with the second flash light emitting device 9.

[0014]

The second flash light emitting device 9 is arranged in a recessed portion 30 formed elongate in a direction opposite to the first flash light emitting device 7 from the upper central portion of the front surface of camera body 1, and configured to be slidable to the left/right, by means of knob 29. As to the slide mechanism for sliding the second flash light emitting device 9, various mechanisms may be available. For example, rotation of said knob 29 may be transmitted to the second flash light emitting device 9 by means of a threaded rod, or transmitted by a gear, a wire or the like. Further, the sliding mechanism is not always necessary, and the device may be slid manually. The second flash light emitting device 9 is adopted such that at the time of taking a photograph at a long range, the device does not emit light even when release button 26

is pressed, and only at the time of taking a close-up photograph and at the time of confirming how the shadow of subject 5 appears, the device is used together with the first flash light emitting device 7.

[0015]

Said preliminary light emitting button 28 is used, for example, at the time of confirming how the shadow appears, before actually taking the photograph. When preliminary light emitting button 28 is pressed for operation, a trigger is sent to a strobe circuit and the first and second flash light emitting devices 7 and 9 emit light simultaneously. At this time, release button 26 is not operated, and therefore, the shutter is not opened.

[0016]

The manner how a shadow in the horizontal direction appears when the flash light emitting devices are used for taking a close-up photograph of the camera having such a configuration will be described. When light is emitted from the first flash light emitting device 7, shadows 8c and 8d appear on areas a and b on the background 30 behind subject 5, as shown in Fig. 2. At this time, the second flash light emitting device 9 also emits light simultaneously and irradiates the subject 5. Therefore, if the second flash light emitting device 9 is moved beforehand to the position A of Fig. 2, the shadow 8d can entirely be irradiated by the second flash light emitting device 9. Thus, the shadow 8d is made moderate, resulting in a quite natural close-up photograph.

[0017]

Further, if light source 10 is on the right of camera 20 as one faces, a shadow 11 resulting from the light source 10 appears outer than said shadow 8d. In that case, the second flash light emitting device 9 is moved from position A to position B of Fig. 2 so that the shadow 11 is covered within the scope of irradiation, whereby the shadow 11 derived from light source 10 can also be made moderate. If light source 10 is not on the right of camera 20 as one faces but on the left side, a shadow 35 resulting from light source 10 appears on a side of shadow 8c, opposite to shadow 8d. In that case, the second flash light emitting device may be moved to a position C, that is opposite to the position B with respect to position A. Further, in order to make the shadow less sharp, light intensity of first and second flash light emitting devices 7 and 9 may be changed, while the second flash light emitting device is moved. If it is desired to confirm how the shadow appears on subject 5 before actually taking a photograph, preliminary light emitting button 28 is pressed for operation, to cause the first and second flash light emitting devices 7 and 9 to emit light simultaneously. The position of the second flash light emitting device 9 may be determined after looking at how the shadow appears at

that time.

[0018]

Though a camera containing two first flash light emitting devices 7 and 9 has been described in the embodiment above, the present invention is not at all limited thereto, and the camera may contain two or more such devices.

[0019]

[Effects of the Invention]

As described above, according to the camera with built-in flash light emitting devices of the present invention, at least two flash light emitting devices are provided, and one of the devices is arranged slidable to the left/right. Therefore, by moving the slidable flash light emitting device in accordance with the conditions of the subject, optimal photographing with flash light becomes possible when taking a close-up photograph, and a photograph with natural shadow can be taken. Further, by simply causing the flash light emitting devices to emit light before actually taking a photograph, it becomes possible to confirm how the shadow appears around the subject. Therefore, the slidable flash light emitting device can be moved to an optimal position.

[Brief Description of the Drawings]

Fig. 1 is a front view showing an embodiment of a camera with built-in flash light emitting devices in accordance with the present invention.

Fig. 2 shows a shadow in the horizontal direction and the range of photographing by the first flash light emitting device.

Fig. 3 shows a shadow in the vertical direction and the range of photographing in taking a close-up photograph by a conventional camera containing a flash light emitting device.

Fig. 4 shows a shadow in the horizontal direction and the range of photographing in taking a close-up photograph by a conventional camera containing a flash light emitting device.

Fig. 5 shows how a shadow appears in the horizontal direction in taking a close-up photograph by a conventional camera containing two flash light emitting devices.

[Description of Reference Characters]

- |   |                    |
|---|--------------------|
| 1 | camera body        |
| 2 | lens barrel        |
| 3 | image pick-up lens |
| 4 | image forming film |
| 5 | subject            |

- 7 first flash light emitting device
- 9 second flash light emitting device
- 10 light source
- 21 AF light projecting portion
- 22 AF light receiving portion
- 23 finder window
- 26 release button
- 28 preliminary light emitting button